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Caldwell (Chs.)

THOUGHTS
ON THE
CHARACTER AND STANDING
OF THE
MECHANICAL PROFESSION:

A DISCOURSE,
DELIVERED BY INVITATION,
TO THE
MECHANICAL INSTITUTE OF THE CITY OF LOUISVILLE,

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THOUGHTS ON THE CHARACTER AND STANDING
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MECHANICAL PROFESSION.

Gentlemen of the Mechanical Institute—

SOCIETY, when so extensive and regularly framed, as to constitute what is known by the name of a community, whatever may be its form, condition, or structure, is composed of individuals differing from each other in native endowments, and devoted to different occupations and pursuits. Such diversity moreover is not only expedient and useful, but absolutely necessary to the comfort and being of civilized man. On no other ground could social establishments on a large scale either have an existence, or be beneficial to those composing them if they did exist. Sameness of talent and occupation in each of their members would be fatal to the whole. And to different occupations, or rather to the classes of individuals engaged in them, are assigned, by universal consent, different degrees of rank and influence in private life, as well as in the transaction of public affairs.

This state of things, though it exists to some extent in society of every description, is much the most prevalent and permanently settled, in that which is civilized, cultivated and enlightened. And the higher its civilization and intelligence, refinement and fashion, the deeper-rooted are the sentiments and custom to which I have referred, the more powerful their influence, and the more unvarying their effects.

In savage life, where the structure of society is simple, the pursuits of the people are few; the degrees of rank and standing are also few; and the difference between them is

comparatively inconsiderable. Philosophers, artists, manufacturers, and merchants there are none—none certainly of distinction or influence. Nor is the humble and limited condition of agriculture productive of either wealth, consideration or power. The chief warriors, hunters, and counselors, with an occasional impostor regarded as a prophet or a medicine man, overawing the credulous by mysterious predictions, or curing diseases by conjurations and charms, compose the aggregate of their principal men.

In civil and cultivated life, the case is different. There, art and discipline have carried out, matured, and practically applied the diversities of endowment which nature had bestowed. Hence the pursuits of the people are numerous and multifarious, the ranks in society are correspondingly numerous, and the differences between those ranks strongly marked, sanctioned and established by public opinion and usage, and punctiliously observed. There we find servants and day-laborers, herdsmen of various descriptions, soldiers, sailors and other kinds of watermen; agriculturists, horticulturists, mechanics and artists; traders, merchants and statesmen; civil, military and naval officers of different ranks; members of the three learned professions, scholars, teachers, and authors in all the departments of literature; gentry, noblemen, princes by merit and descent, and princes of the blood; kings, emperors, and men of other employments and stations, which it would be equally tedious and superfluous to specify.

To individuals, I say, thus variously classed, whether by their private pursuits and occupations, or by the public trusts confided to them, rank and consideration almost equally various are uniformly assigned. It is a question therefore of some curiosity and interest at least, if not of higher concern, whether this assignment be made with fairness and justice, as respects every rank or degree of standing which it embraces, and aids in establishing?—or whether it does not attach to some trusts and occupations a rank and consideration superior, and to others inferior, to what they rightfully deserve?

A solution of this problem, as relates to *all* the pursuits and occupations of civil life, it is not my purpose at present to attempt. Not only would the task be intricate and weighty, beyond my resources and means to accomplish it; its multifariousness and complexity would require years of research to analyze and unravel them, and volumes of composition to make them fairly understood. As respects success then, in an undertaking so arduous, how unavailing and hopeless would be a week of inquiry, and a limited discourse!

Forbidden by these considerations to attempt so wide a scope of examination, united to so lofty an aim, as would embrace the whole subject to which reference has been made, my only design on this occasion, is to submit to you a few thoughts on the character and standing of a single occupation. And that occupation, though familiar to every one, daily witnessed, and constantly felt in civilized society, is, in my estimation, and, as I shall endeavor to make appear, but imperfectly understood in its real character, and greatly underrated as respects its merit and importance, as well as the rank which it is entitled to hold. I allude to the **MECHANICAL PROFESSION.**

That my views in the discussion I am about to engage in may not be misapprehended, let me here, in the threshold of it, be distinctly understood. I consider the profession just named, as including the *science and art of invention and construction*, in all the variety, and to the whole extent of the means, operations and products, that justly belong to them. And under that latitude of interpretation is it my purpose to treat of it. But before commencing the analysis of my subject, a few further remarks are deemed requisite.

Let it not be alleged that I overstep the limits of the mechanical profession, by representing the work of invention as one of its elements. The charge would be groundless. To invent falls more immediately within the province of the mechanist, than within that of any other character—the poet and the novelist perhaps excepted. And the mechanist alone gives to his inventions a substantial existence—a real and lasting form and “local habitation,” as well as a name.

The inventions of others are purely *ideal*, and, but for the aid of mechanism in giving them fixity and value, would be as fleeting and unprofitable as the dreams of the castle-builder, or the visions of the insane. The products of mechanists therefore have in them a *reality*, which assimilates them much more nearly to *actual creations*, than the products of any other classes of men.

Every apparatus, or specimen of machinery is intended and framed to produce some given result, and to subserve some specific purpose. That it may be adapted therefore to the end contemplated, *invention* as well as *judgment* must be called into action and skilfully employed. Without them nothing useful in mechanism can be accomplished; nor can even a plausible hope to that effect be entertained.

In the *first* formation of every structure or piece of machinery (and every "structure" had a "first formation") the inventive process not only preceded the handicraft-operation, but stood related to it as its *cause*. In every movement of the workman's hand, and in every change made or meditated by him in the fabric he was framing, his mind directed, and was the source of action. And a mistake or failure in that source would have produced a corresponding mistake or failure in the work.

I do not say that the mere operative mechanic exercises invention in the construction of machines that have previously existed. Quite otherwise. Such a workman is only an imitator, and occupies in his profession an inferior standing. But no matter. The machine was originally invented by the mind of its author, before it was framed by the action of his hands. Its *archetype* existed in his mind, *in idea*, before it existed *really* itself in wood or metal.

But the power of invention, if not identical with genius, is one of its highest and most valuable elements. I should rather perhaps say, its most productive and profitable source of action. And genius is among the choicest attributes of mind. From these premises, the truth of which will not be controverted, the inference is equally plain and irresistible. Genius, in one of its most important qualities, belongs, as already

mentioned, to the mechanical profession, as certainly, and in as eminent a degree, as to any of the other occupations of man. This position will receive presently, by exemplification, a more practical illustration and proof, than can be derived for it from first principles, by a process of reasoning.

In this early stage of my discussion, it is worthy of remark, that, among the several departments of science, that of Mechanics holds a rank very elevated and respectable. Nor is it less distinguished by its practical usefulness. To the convenience, comfort, and welfare, if not the very existence of civilized society, especially where population is numerous and dense, and refinement and luxury of a high order, some of the branches of this department of science are indispensable. Of these may be mentioned in particular, optics, acoustics, dynamics, hydraulics, hydrostatics, and a few others. These, though, in works on Natural and Experimental philosophy, not always perhaps technically included and treated of, under the head of Mechanics, are notwithstanding subdivisions of that important branch of knowledge. At least they depend on it for their existence and usefulness. But to descend from first principles and general statements, to specification and proof.

The more clearly to show the utility and importance of the mechanical profession, in common with the comparative rank it should occupy, I shall speak of it, not *potentially*, but *really*—not as respects what it is *calculated to do*, and *may* do, but what it *has already done*, and must continue to do. And in thus treating of it, provided I do it justice, I shall not fail to demonstrate, that, if it does not constitute the foundation of *all* other pursuits, of whatever description, it is to the *existence of most*, and to the *perfection of the whole*, of them, *absolutely essential*. Without its aid the present fabric of society could never have been erected; and were its aid now withdrawn, that fabric would become a ruin, and barbarism, with its repulsiveness and horrors, would return.

As relates to their products and influences on society, the pursuits of man divide themselves naturally into two classes—the *useful* and the *ornamental*. And to the being and perfec-

tion of both, the mechanical profession is alike indispensable. In the consideration of that profession therefore, in its practical bearings, I shall begin by submitting to you a few thoughts on the aid it affords to the useful occupations. Of these the most ancient and important is agriculture. With it therefore my analysis shall begin.

That pursuit, whose product is essential to the subsistence of man, as well as of the domestic animals he employs, is dependent for all its implements, and of course for its operations in all its departments, on the mechanical profession. Without that profession, where would be the axe, the mattock, and the hoe; the plough, the harrow, the shovel, and the spade? or where even the material, of which the metallic portion of them is made? where again the scythe, the sickle, and the wheel-carriage; the barn, the granary, and the crib? where the flail or other instrument to beat out the grain, the fan to winnow it, and the mill to grind it? and, embracing, in my remarks on agriculture, an indispensable branch of domestic economy, (I allude to cookery,) where would be the numerous kitchen utensils, to prepare, for the sustenance of the household, the products of the field, the orchard, and the garden?

To these questions a suitable reply must have occurred already to every one who hears me. And with every one that reply must be the same. From the lips of each listener I hear in fancy the following words — or forms of expression to the same effect. “Without the creative action of the mechanical profession, the implements referred to would have been *nameless non-entities*.” Nor are all the requirements indispensable to the agriculturist yet enumerated. He must have his family-dwelling, his dairy-house, his pump, and some form of shelter for his domestic animals, with many other fabrics which time and circumstance forbid me to recount. And for all these he is indebted exclusively to the mechanical profession.

It may here be remarked, that a second very abundant source of food for the sustenance of man, conferring on him moreover many other benefits, is the business of fishing. And

it, for its very existence, is dependent on mechanism. Without his hook and line, his gig and net, his harpoon and boat, and his other forms of fishing apparatus, the fisherman would famish on the bank of the river, the margin of the lake, or the shore of the ocean. But I need hardly add, that all this machinery is the product of the mechanic.

Next in utility and importance to agriculture are manufactures, in the general scope and signification of the term. And they, in every department, and throughout the whole variety and extent of every department, are the immediate creation of the same profession. To confirm my position by adducing a few examples.

Let me commence this process of illustration and proof by inviting your attention to the manufacture of iron, in its several diversified operations and their results, including its reduction from ore to a metallic state, the almost boundless scale on which it is formed into instruments and ornaments, and the innumerable and indispensable purposes, to which those products are subsequently applied.

The want of this metal, were man to be deprived of it, would rank with the most calamitous privations he could sustain. His powers of action both mental and corporeal would be immensely curtailed by it in compass as well as efficiency, his comforts and enjoyments would be correspondingly withdrawn, and his abode, now joyous and happy, would be changed into a scene of comparative desolation. But iron, with all its usefulness and value, would be nothing but masses of unprofitable ore, were it not for the mechanical processes, by which it is redeemed from that condition, and rendered by far the most important of metals—a metal, without which civilization, science, letters, and the arts, could never have attained to their present standing.

From the same source with iron comes every article of our personal apparel. From head to foot we are clad by the manifold operations of the mechanical calling. From the hat and the bonnet, to the boot and the shoe, *it* first prepares the materials of our clothing, and then fits them to our persons.

Of every article of our common and necessary household

furniture the same is true. The floor-covering on which we tread, the stool, the chair, the bench, and the settee, on which we sit or recline, the table, with all that covers it, which is spread and provided for our sustenance and enjoyment, and the bed and bedstead, with the apparel that belongs to them, where we take our nightly repose, are all the offspring of the mechanical profession. So are our doors and windows, with their locks, shutters, and sashes; our stairs and mantles, our fire-grates, andirons, stoves, candlesticks, lamps, sconces, and candles, with all other sorts of implements and apparatus for warming, ventilating, and lighting our dwellings, and for rendering them open to ourselves, and secure from the aggressions of felony and violence. And so are our cupboards, bureaux, secretaries, book-cases, and every other description of manufacture, whether of wood, metal, stone, or other material, that ministers to our necessities and comforts, or that contributes to the convenience and usefulness of the interior of our houses. Nor is the enumeration of the contributions made to manufactures by the mechanical profession yet complete. Far from it. Nor is this all. To complete it in a discourse like the present is impossible. A brief reference to it therefore in general terms is all I am attempting.

Before advancing farther however in this disquisition, I shall offer a remark, which, on its first utterance, will appear perhaps paradoxical, if not self-contradictory and groundless. Yet is it perfectly and palpably true. The mechanical profession is itself an example (the only one I believe that earth possesses) of what may be correctly denominated *self-creation*. It first invents and creates the suits of tools and instruments, with which it produces afterwards its other creations. In this condition of *self-dependency* it stands alone. And in that perhaps consists its highest prerogative. But to proceed in my discussion.

The contributions made to processes of fixed action and locomotion by steam-enginery alone, constitute a subject of stupendous magnitude, and would furnish of themselves a theme of discussion almost inexhaustible. Were I to pronounce the aggregate of these contributions an object surpassing in sub-

limity and grandeur all other human productions, the assertion could hardly be called groundless or extravagant. By the ingenious contrivances and manipulations of the mechanist, steam is made to operate like the vivifying spirit of a disciplined agent. When thus rendered instinct with it, even mighty masses of dead matter perform, as if spontaneously and intellectually, the manifold and well directed actions of life. The very soul of the mechanician seems infused into his machinery.

Steam-enginery, itself a mechanical creation and a mechanical wonder, has, in its application to manufactures, within the present century, revolutionized christendom, and given to its modes of labour and its processes of industry, in its countless work-shops and factories, a new aspect and a productive efficiency, immeasurably beyond what they had previously possessed. Stronger still; beyond what the mind of mortal had imagined. As if by a new-created principle of life and motion I say, or by the wonder-working hands of invisible giants, it has thrown into action, for the accommodation and benefit of man, millions on millions of wheels, and axles, and shafts, and pistons—hammers, saws, plains, augers, pumps, presses, spindles, looms, and other forms of operative machinery, making an aggregate so boundless, that the very contemplation of it becomes overwhelming to the fancy, and the computation of its influence on society a task too mighty for human achievement. Its trouble-saving, productive, and labour-saving effects, and the augmentation of power it has bestowed on man, by the operation of these instruments, are also incalculable. By the aid of it the British empire alone has I doubt not done more in the business of manufactures, within the last twenty years, than the entire population of the world could have done without it. To divest this supposition of the air of romance, which it may perhaps be thought to wear, two facts are deemed sufficient.

The press-work and some of the other processes of a certain London News-paper (I think it is the Times) are performed by steam-enginery. And it has been ascertained by computation, that the mere transcribing of the amount of printed

matter issued daily, in that Journal, would require the labour of a *million of pens* ! The exact number of hands employed in the establishment is not known to me. It can hardly however I presume exceed a hundred, and is probably much less.

By another calculation, believed to be equally accurate, it has been found by a late statistical inquirer, that, chiefly by steam-enginery, the county of Lancashire alone performs the manufacturing labour of *twenty millions* of operatives, working only with their hands ! And the proportion of its people engaged in manufactures, compared with its entire population, is exceedingly small — perhaps not more than one to fifty — probably much less. The prediction, half a century ago, of a product by steam-enginery so immeasurable in quantity, would have been received with ridicule, as a nonsensical notion, or with commiseration, as the offspring of lunacy. Yet so familiar to us has the event become, that it no longer excites our wonder ; and the result of the agency is still increasing. And the world is indebted for it to the mechanical profession. It is therefore no hyperbole to assert, that, had that profession done nothing else, it would have been the source of one of the greatest of benefactions to man. How immeasurably vast then is its value rendered by the fact, that it has already been the fountain of millions of others ; and that its exuberance is increasing !

Of trade and commerce the mechanical profession may be termed the creator. Most certainly without it, those forms of business could never have been transacted to any considerable extent or effect.

In proof of this let me first observe, that not an article of trade and commerce can be named, which does not depend, immediately or remotely, on some form of mechanical action, if not for its production and existence, at least for many of its most valuable qualities. That this is true to a great extent, may be confidently inferred from what has been already said on the subjects of agriculture, fishing, and manufactures. And, from remarks to be made hereafter, the truth will farther and more conclusively appear. But this is not all. Not only does

the mechanical profession produce the *material* of trade and commerce, or add to its value; it furnishes also the *means* that are essential to commercial transactions.

Even to the simplest kind of land-commerce (that carried on by the caravans of the east, and by mules, and human beings converted into beasts of burden, in South America) — even to commerce of this description, bridles and saddles, leathern or woven sacks, machines for packing, and sundry other sorts of mechanical apparatus are indispensable. So are swords, and lances, and other military weapons, as instruments of defence against robbers, assassins, and ferocious wild beasts.

To land-trade and commerce, as they prevail in the United States, and in most parts of christendom (perhaps I might say of the civilized world), the mechanical profession contributes more essentially, and to a much greater extent. It creates roads, especially turnpikes and rail-roads, over grounds before impassable, erects bridges, levels or perforates hills and mountains, constructs canals, and furnishes the whole apparatus for package and transportation, protection and storage. In relation to this point it would be superfluous in me to direct your attention to canal-boats and loco-motives, and to passage, and burden-cars, with which you are so familiar. They will immediately present themselves to the mind of every one, arrayed in their vastness, power, and efficiency. Nor need I refer to that marvel of the day, the tunnel under the Thames, which is connected with trade, and is one of the greatest mechanical achievements of modern times.

It might seem an unnecessary descent in me, in this place, to speak of the hoisting and lowering machinery of the warehouse, with the strong-box and the other customary furniture of the counting-house and the sale-room. Yet do they come from the same source, and are essential to the merchant in the details of his business.

To river and ocean-trade and commerce, the contributions of the mechanical profession are still more abundant in amount, and eminently superior in grandeur and magnificence. Of that profession, navigation of every description is another crea-

tion unspeakably important. From that source comes the ship, whatever be her size, configuration, and power, with her masts, and spars, and sails, and anchors, and all her other apparatus and apparel, not excepting her spy-glass and quadrant, her compass and chronometer. Nor must I forget her thermometer and barometer, which, when employed with the requisite judgment and skill, are not only great conveniences, but invaluable instruments of safety at sea.

But striking and even wonderful in its nature and results as is *sail-navigation*, it is, in these respects, inferior — I might say greatly inferior, to navigation by *steam*. While the former is under the control of winds and waves, river-streams and ocean-currents, the latter defies, encounters, and vanquishes them all, and triumphs in its course, in opposition to their might. While sail-navigation only avails itself of the already-existing powers of nature, steam-navigation creates and employs a power of its own. And all this it does through the instrumentality of the mechanical profession. The mechanician first invents and constructs the apparatus requisite for the production of steam, and then the machinery to be thrown into action by it. And that action is so resistless, as to cut its way through the ocean in every condition, whether maddened by the tempest, or slumbering in a calm. Nor, without the mechanician's aid, could success be achieved in any portion of the process. Neither could the steam be called into existence, nor controlled and rendered subservient to useful purposes, did it already exist.

So wonder-working is steam, when thus generated, and thrown into useful and productive action by the mechanical profession, and so beneficial are its effects, that, had it been known to the ancients as it is to the moderns, a god would have been assigned to it, in direction of its destiny, and for the attainment of its ends; and, in honor of that god, temples would have been erected, a priesthood appointed, and worship performed. Honors of this description to a god of steam would have been precisely analogous to those paid by the Greeks and Romans to their gods and goddesses that presided over air, fire and water, storms and tempests, the arts and

sciences, wisdom, hunting, spring-time and harvest, and other powerful phenomena and forms of agency.

By the generation and practical employment of steam have two individuals, Watt of Great Britain, and Fulton of the United States, produced, in the world of motion and business, a revolution and a general scheme of improvement, such as have never before been witnessed or imagined. They have been the founders of a new era, as important and unlooked for, as it is resplendent and astonishing.

We read much in history, fable, and poetry, and hear much in conversation, of the ages of heroism, republics, and despotisms; of the ages of the Antonines and other beneficent and moral princes, and also of princes who were revolting monuments of profligacy and crime. Nor has the world been without its ages of desolating conquerors, and of great reformers. Of such ages I say we are sufficiently informed through various channels; and we read and hear still more of the Dark Ages. But, when weighed in the scales of sober and enlightened reason and truth, and considered in respect to the permanence and grandeur of their effects, what are either or all of these, compared to the age of Watt and Fulton! But little more I reply than a dew-drop to the ocean—or than fiction to reality. When all the other ages referred to shall have passed from remembrance, like so many shadows that came but to depart, or when their still existing but fast-decaying traces shall be regarded but as time-worn monuments, and their stories be listened to but as tales of by-gone times; even then shall the spirit of the age of Watt and Fulton be fresh and vigorous, and its effects shall still appear in a vivid, magnificent, and unfading display of operations and results, contributing in an equal degree to the grandeur, wealth, and power of communities, and to the comfort and welfare of individual man.

The present age then of steam-power and mechanism stands in gloriouse contrast to *all* preceding ones, but more especially to the Dark Ages. The reason is plain. The latter ages, as their name imports, were a period of intellectual gloom and inaction, untamed passions prompting to deeds of darkness

and horror, dreamy indolence, and general decadency ; while the former is every where instinct with the spirit of light and enterprise, high civilization and its concomitant aversion from violence and blood, useful industry, and general improvement. And, as already appears, but will presently be made to appear more fully, the mental lights, as well as the moral temper, and the material movements and action of the age we live in are referable in a high degree to the mechanical profession.

In one respect the steam-engine has already produced effects, and is still augmenting them, which are scarcely short of miraculous. I allude to the increase it has given to the velocity of movement in travels and voyages. By this increase it has made *in fact* a much nearer approach to the annihilation of time and space, than had been previously conceived *in fancy* by man. Rivalling the swiftness of the eagle on his wing, it has reduced months to much less than weeks, weeks to days, and miles to furlongs. And it is still I say so steadily adding to its speed, that prediction and conjecture, as to its ultimate limit, is baffled and confounded.

In this way not only has steam-power brought virtually into the vicinity of each other, points in the same country once separated by formidable distances ; it has done the same in relation to different countries which nature had disjoined by oceans and seas. Divesting them of the character of strangers to each other, it has practically converted such countries into neighbours. Assuming then as our premises the present and the past, and inferring as to the probable product of the future, it can hardly be called extravagant in us to look forward to the time, when all the civilized and cultivated nations of the earth, however distant from each other by position, and whatever physical barriers may now lie between them, will, as relates to social and friendly, political and commercial purposes, be reduced to the condition of vicinal communities.

Already, by the agency of steam-power, are the extreme borders of our own country almost in union with one another ; and we are thus consolidated into a *national neighbourhood*. Already is a voyage from America to Europe, in former days a very tedious and perilous enterprise, but little else than an

excursion of pleasure. And already, from this spot, may the city of Jerusalem be reached in about seven weeks! Nor, from the great and rapid extension and improvement in steam-travelling by land and water, which are constantly occurring, is it at all unreasonable to anticipate the day, when the journey may be accomplished in half of the time. And, from the shores of the New World, will other points in the Old, be arrived at in a period proportionally short.

In this anticipation there is much less of apparent extravagance, than there would have been, fifty years ago, in the belief and assertion, that, by the year 1840, trains of cars, carrying hundreds of passengers, would run daily from Philadelphia to New York, or from the latter to the former city, in six hours, without horses. Yet is the performance of these journies now an occurrence so familiar, as to excite no surprise. And so, in time to come, will be the other journies and voyages, to which I have referred. And the achievement will be attributable to the mechanical profession.

Assimilated to steam in power and action is gun-powder, the invention of which was so prolific in changes and new events of magnitude and moment, as to produce an era in the history of nations. In a special manner it revolutionized the arts of war and hunting, rendering the latter more successful and less dangerous, and divesting the former of not a little of its ferocious character, and detracting in no small degree from its sanguinary effects. By augmenting moreover the protective power of the weak against the strong, and of the unoffending and the orderly against the lawless and the vicious, and by subserving many of the useful arts and operations of civil life, it has been eminently salutary in its influence on society.

But gunpowder also, with all its power, and all its benefits, comes directly from the mechanical profession. Whatever preconceptions might have been formed, or discoveries *in idea* made in relation to it, never could it have been prepared, and brought into *actual existence*, without apparatus suited to the purpose from the hand of the mechanist. Nor, even if thus prepared and perfected, could it, without the aid of

machinery from the same quarter, have been applied to the uses which it now subserves. Without the construction of ordnance and other kinds of fire-arms, with the apparatus appropriate to them, gunpowder would have been useless in hunting and war; and without the machinery necessary for its employment, it would have been equally useless in the rending of rocks, the demolition of fortresses, the blowing up of houses to arrest conflagrations, and other purpose to which it has been applied. As well then to the production of that article, as to all its practical efficiencies, whether in civil or military life, the mechanical profession is indispensable.

Of the art of printing, in some respects the most important of all inventions in its influence on society, the same may be affirmed. It is one of the great contributions of the mechanical profession to the promotion and preservation of science and literature, and therefore to the rights, the welfare, and the standing of man, and the glory of the world. Even the ink and the paper used by the printer are mechanical products. So are the types and the frame-work in which they are arranged, and which holds them together. And so are the press to whose action they are submitted, and the arrangement, structure, and finish of the volume, in which is comprised the issue of the process.

But wherefore need I dwell on the subject in detail? The art of printing in all its elements and operations, by which are recorded and preserved from oblivion, diffused throughout the world of science and letters, and transmitted interminably, through ages and epochs, the brightest and most invaluable productions of mind — this art I say, which, were it not for our familiarity with it, would be deemed by us all but divine, consists as literally in a mechanical process, as does the construction of a chest of drawers, a sofa, or a chair, or of any other article of household furniture.

But the influence and benefactions of the mechanical profession, in their multiplicity and extent, are not yet portrayed. Far from it. Not a branch of science can be named, which is not more or less dependent on it, not merely for its appliance and usefulness, but for its production and existence.

Of all the sciences that of music, when also practised as an art, is far the most delightful, and in some respects likewise the most powerful and useful. My allusion is to instrumental music.

That, of all the arts, most entirely takes possession of the soul, fascinates and subdues it, and moulds it to its purposes. It melts it to love, embitters it with hate, fires it with rage, attunes it to gaiety, merriment and joy, inflames it with courage, soothes it under sorrow and suffering, fans it in the holiest fervor of piety, inspires it with the loftiest sentiments of devotion, and produces in it the happiest frame for adoration and homage. And for all these purposes it is successfully employed on suitable occasions.

It was thus, on account of its delightfulness and power, that the Greeks, in the fruitfulness, brilliancy and correctness of their fancy, the soundness of their taste, and the beauty and fitness of their mythological doctrines, assigned it to the authorship and superintendence of the most accomplished of their Gods. Hence, under the wonder-working impulses of this art, and conscious of the influence and control over the minds of others, which it imparted to him;

"At the Royal feast for Persia won,
"By Philip's warlike son,"

as the poet tells us,

"Timotheus placed on high
"Amid the tuneful choir,
"With flying fingers touched the lyre,
"The trembling notes ascend the sky,
"And heavenly joys inspire."

Nor was it joy alone that was thus awakened. The great lyrist, changing at pleasure the spirit and tone and measure of his minstrelsy, called up, at every change, a new and corresponding passion in the royal listener, until he not only enraptured and maddened, by the charms and witchery of music, but conquered by its mightiness, the CONQUEROR OF THE WORLD. And the instruments of his victory he received from the mechanist. Nor is this all.

Remove the mechanical apparatus of the laboratory, and chemistry, with all its beauty and brilliancy, its peculiar fascination and boundless usefulness, will be but a name. And, but for the same agency, even its very name would be want-

ing; because there could have been nothing on which to affix that name, and therefore no motive to lead to its formation.

Of natural or experimental philosophy, including optics, acoustics, dynamics, hydrostatics, and hydraulics, the same is true. Destroy their apparatus, and nothing of the past will remain to them but their history, and nothing of the future but hopeless inaction. Their practical efficiency and usefulness will be extinguished. Even these glasses, which, by repairing, to some extent, the decay of vision, alleviate one of the deepest discomforts of age, will be calamitously withheld. In that case would every one, far advanced in years, be in a condition and temper of mind to take up, and to realize but too feelingly, the touching and inimitable lament of the poet, on account of his blindness;

“—————Thus with the year
 “Seasons return; hut not to me returns
 “Day, or the sweet approach of even or morn,
 “Or sight of vernal bloom, or summer’s rose,
 “Or flocks or herds, or human face divine;
 “But cloud instead, and ever-during dark
 “Surround me, from the cheerful ways of men
 “Cut off, and for the book of knowledge fair
 “Presented with an universal blank
 “Of Nature’s works to me expunged and rased,
 “And wisdom at one entrance quite shut out.”

Of medicine in all its branches, more especially in surgery, the same may be asserted. It rests on mechanics. Without its instruments and apparatus, the product of the mechanist, it could never have had an existence. Withhold those articles, and, except in memory, and in the records of the past, it will exist no longer.

Nor can less be said of any of the practical branches of mathematics. From guaging, mensuration, geometry, trigonometry, surveying and navigation, remove the contributions which the mechanist has made, and their ruin is complete. And with them will perish most of the comforts and blessings of the present, and a like number of the hopes and expectations of the future, which constitute some of the choicest elements of human happiness.

The microscope, which has long been employed by curious inquirers, with gratification to themselves, and benefit to science, and which, by improvements in its structure, and

superior skill and perseverance in the use of it, has recently disclosed to us a new creation, is a boon of pre-eminent value bestowed on our race, by the mechanical profession. That searching instrument, by lifting one of the wide-spread curtains of nature, dense in itself, and impenetrable to the unaided vision of man, has unveiled to us a region of living existence, immeasurably more extensive and populous, than had been previously imagined, even by the warmest of enthusiasts, or the wildest of visionaries. It has taught us that every secreted fluid of our own bodies, as well as such fluids in inferior animals, every leaf, and stem, and flower, and seed of every vegetable production, and every drop of water, whether salt or fresh, running or stagnant, is peopled with myriads of living beings, each of them exhibiting a form and organization as exquisitely fitted to its place of abode, and mode of life, as those of superior beings; and each perhaps bounteously partaking of the pleasures of existence. And it farther teaches us, that no inconsiderable portion of the crust of our globe is composed of the relics of masses of animalcules, until recently undiscovered, which, in ages past, have been tenants of life in common with ourselves.

Is any one inclined to question the value of these discoveries, because they are not immediately applicable to what are called the practical purposes of life? I reply that, on sundry grounds, they are highly valuable. They augment our knowledge of nature, an effect which, unless neglected or abused, never fails, nor can fail, to add to our comfort and happiness, as well as to our wisdom, to our power of being useful and efficient, and to our moral worth. Such knowledge expands, enriches, and liberalizes the mind, divests it of narrowing prejudices and perverting superstitions, supplies it with not only an ampler, but a more profitable stock of materials to work *on* and to work *with*, and thus prepares it to act with greater and more certain execution and influence, and to higher effect. Such knowledge bears to the mind the same relation that a plentiful amount of salutary nourishment bears to the body. It augments and sustains its sound condition, its vigour and usefulness.

But the most invaluable influence of the discoveries I am considering is yet to be mentioned. By disclosing to us a much more wide-spread and abundant scheme of living nature, fitted to enjoy existence, if not to appreciate the privileges attached to it, than had been previously witnessed, they convince us more thoroughly of the boundless beneficence of the Creator of all things, elevate our conceptions of his other attributes, more especially of his wisdom and mightiness, and deepen our sense of the obligation we are under, to render to him thanks, veneration, and homage. Thus are we schooled in the religion of nature, by the same profession, to which we are indebted for the other numerous and important benefits to which reference has been made. Nor is my subject yet exhausted.

The telescope, in like manner with the microscope, is an immediate production of the mechanical profession. So is the whole array of astronomical apparatus. And of the lights which these instruments have shed on science, of the elevation and expansion they have given to the human intellect and the human feelings, of the extent to which they have strengthened the sinews of morality and religion, and of the degree in which, through such channels, they have benefited our race, and elevated its standing, it were superfluous in me to speak. These effects, in every way so momentous, and amounting to a general amelioration of mind, are already familiar to cultivated man; and no language of mine could adequately portray them.

Astronomy comparatively belittles by its vastness, and, by its matchless lustre, throws into shadow, every other human pursuit. By unbarring the portals of interminable space, and thus liberating man from the lowliness and narrowness of his earthly abode, it confers on him the freedom of the whole realm of creation, and renders him a denizen of the universe at large. This it does by conveying him on beams of light, with a swiftness that reckons not of time or distance, from orb to orb, through the entire organization of the material heavens, and thus reveals to him, far beyond the power of any other agency, the grandeur and glory of the works of the

Creator. Of angelic natures, their comprehension, movements, and powers, we hear and conjecture much, yet *know* nothing. But whatever approach man may be supposed to make to what we *fancy* of their perfections, he owes much more to astronomy than to any other source.

Mighty as was the display, which, on this subject, Newton made of the almost omnipotent power of the human intellect, the Herschels of England, and Laplace of France, have immeasurably surpassed him, and opened a new epoch in the annals of astronomy. And the means by which they effected this improvement, are familiar to every astronomical inquirer.

The success of the former, in their illustrious career, arose chiefly from their employment of their greatly improved and magnificent telescope, prepared for them by the genius and skill of their mechanists. By that stupendous article of mechanism, they penetrated in vision to millions of stars, and suns, and systems, and nebulae, the existence of which had never entered into the dreams of either Newton himself, his contemporaries or predecessors. By the aid of that sublime and wonderful instrument, as if compassing, in their ken immensity itself, and approaching by it the very footstool of the throne of the Eternal, they more nearly realized the lines of the poet, than the eye of mortal had ever done before;

“Slave to no sect, (they took) no private road,
“But (looked) through nature, up to nature’s God.”

Thus did they unfold a much more grand and overwhelming display of the works of creation, and of the perfections of the Deity, than had been previously witnessed by earth-born beings, and gave to man more powerful motives than he had before experienced, to dwell on the glorious landscape of immensity, with sentiments of wonder, adoration, and awe, which enter as elements into genuine religion.—But enough of this poetical excursion through the organized heavens. Let us now descend to earth, and discourse, for a moment, in sober prose, on some of the more practical uses of astronomy.

It is by the movements and changes of position of the heavenly bodies, that time is computed, and significant names bestowed on its elements. Hence is astronomy essential to

chronology ; and chronology is so essential to the whole economy of the civilized world, including the interests of science, arts, and letters, not to speak of the comforts and conveniences of public and household life, that, without it, irregularity and confusion, with their concomitant and never-ending annoyances and disasters, would every where prevail. Nor is it inappropriate in me to add, that the giving of a tongue and a language to time, by the construction of clocks and watches, chronometers and other sorts of time-tellers, is among the most interesting and important achievements of art. And it would be so considered by every one, did not our familiarity with those productions prevent us from bestowing on them the admiration they deserve.

The art of navigation, especially the navigation of seas and oceans, depends for its existence on the science of astronomy. And on navigation depends, among other matters of pre-eminent importance, our knowledge of the true figure and general geography and productions of the globe we inhabit. Most assuredly, without traversing and exploring seas and oceans, as well as countries, that knowledge, though it might have been begun, and though some progress might have been made in it, could never have been carried to the perfection it has attained. Circumnavigation, giving to us, as it does, an acquaintance with the many hundreds, perhaps thousands of islands and their inhabitants, vegetable and animal, that stud and variegate the seas and oceans of the northern, western, and southern regions of the globe, is itself an achievement both *iustructive* and *sublime*. And, in both these respects, the discovery of the New World is still far superior. Of all the events accomplished by man, the discovery of America is the most important — the greatest and most glorious in itself, and the most momentous in its ultimate influence on the condition of nations, and the destinies of our race. And, in common with circumnavigation, *it* is another of the boons of astronomy.

Nor did Columbus only *discover* the New World by the aid of that science. He also did much by the same means to secure the fruits and benefits of that discovery for his con-

temporaries and posterity. This he affected, by employing his knowledge of astronomy, if not for the actual preservation of the lives of himself and his followers, at least for their relief from danger and suffering. I allude to the occasion, when the natives of Hispaniola, actuated by a turbulent and rebellious spirit, refused to supply him with provisions, when his stores were exhausted, and famine was impending.

A solar eclipse was at hand. Availing himself of his knowledge of this, Columbus threatened the malcontents with the displeasure and vengeance of the Great Spirit, on account of their misconduct. In proof that such displeasure was already awakened, and that punishment would follow, unless they made atonement by complying with his requisitions and supplying his wants, he told them that, at a given hour of a specified day, the sun would hide his face, and refuse to shine on them. The hour arrived, and, to their unspeakable dismay, according to his prediction, that luminary, the god of their worship, withdrew his light. The effect was magical. The offenders fell prostrate, in an agony of repentance, beneath the rebuke of their angered deity, and implored forgiveness, and a restoration to favour. The issue of the occurrence could not be doubtful. Columbus triumphed. He was regarded by those who had meditated his ruin, as a favourite at least, if not as an immediate descendant, of heaven; and his wants were promptly and abundantly supplied.—But wherefore should I refer to minutiae like these? Astronomy, navigation, and geography, in mass, with their numerous concomitant and dependent pursuits, and with the wealth and power, the facilities and countless benefits they bestow, are, in a high degree, the product of the mechanical profession.

When regarded in another point of view, that profession assumes a still more elevated rank. In its character and bearing it becomes even sacred; because it is essentially connected with one of the primitive ordinances of Heaven. In Genesis, Chap. 1, verse 28, the Deity is represented as saying to man, in a tone of authority, at least, if not that of command; “Have dominion over the fish of the sea, and over the fowl of the air, and over every living thing that moveth upon

the earth." But it is certain and obvious, that this behest could never have been complied with, had not man derived from the mechanist the instruments and means requisite to the attainment and maintenance of such "dominion." The reason is plain. Man is, by nature, one of the most defenceless and powerless of beings. To every other animal equal to him in bulk, he is greatly inferior in native armour, strength, and activity. Were it not therefore for his artificial weapons of defence and attack, instead of having "dominion" over ferocious and powerful wild beasts, he would become their victim. To the mechanician then he owes at once, not only his supremacy over the animal kingdom, but the boon of his existence, and all its enjoyments.

Thus far have I spoken only of the contributions of the mechanical profession to those sciences, arts, and pursuits, which are not only useful, but essential to the economy of the cultivated world. Let us now advert to the products of art, which, by decorating that world, render it a spectacle of beauty and attractiveness, and we shall find them also to be but issues from the same fountain. In our survey of this branch of the subject, we shall begin with personal and household ornaments.

In this new sphere of observation and research, we find ourselves again in the very midst of the immediate and exclusive creations of the mechanical profession. As relates to personal habiliments and decorations, some of those creations are, the ornamented sandals, the anclets, the robe, the mantle, the turban, the lace, the embroidery, the bracelets, the necklace, the ear-drops, the tiara, and all the other forms of costume and jewelry, that add to the splendor and charms of the fair. Ascending to regal and imperial appendages, those products are further, the purple vestments, the stars, the diadem, the throne, and the diamond-studded sceptre, that belong to the wardrobes and ensignia of the rulers of nations. Nor is our catalogue yet complete.

Diverting our eyes from personal decorations, and looking around the drawing-room and the saloon, we are there presented with the high-finished prismatic or kaleidoscope carpet,

the gilded chair, the ornamented table, the couch, the sofa, the ottoman, the urns, the images, the mirrors, the lamps, the lustres, the candelabras, the carvings and paintings, the prints and draperied curtains, and all other articles of ornament in the highest style of execution and finish, which unite in constituting the attractiveness of the apartment. Nor can our eyes fail to rest for a moment on the suits of exquisitely finished china, and of massive and richly embossed plate, with which the side-board and the table are adorned.

Retiring to chambers and dressing-rooms, our admiration is there renewed by the array of costly and gorgeous furniture with which we are surrounded. Conspicuous in the pageant are superbly curtained and canopied bedsteads and beds, with coverings of silk and pillows of eider-down, curiously-wrought wardrobes, and toilet-tables corresponding in style and beauty, and furnished with every thing necessary for female attiring, and fitted for the gratification of female taste. And all this I say is the immediate product of the mechanical profession. And so (might I make so wide and abrupt a digression) are the magical scenery and decorations of opera-houses and theatres, and the solemn grandeur of the ornamental furniture of temples and churches.

Nor is my panorama of the productions of that profession yet finished. Far otherwise. Were it practicable duly to portray it in language, the most august and magnificent portion of it would be yet to come. I allude to architecture in all its varieties of form and material, structure and embellishment, including temples, and towers, theatrical edifices, palaces, town-houses and ornamental villas, bridges and catacombs, columns and cenotaphs, pyramids, mausoleums, and other monumental fabrics, erected in commemoration of personages and events. Under this head may be included, with sufficient propriety, the highest order of statuary — that for instance which created the Antinous, the dying gladiator, and the Farnesian Hercules; the Minerva and the Jupiter Olympus by Phydias; and those still remaining wonders of genius and taste, the Apollo Belvidere, and the Venus de Medici.

Did circumstances permit me to go into detail on the subject of architectural grandeur, I should dwell chiefly on the products of antiquity, which, in the dimensions and magnificence of its edifices, took a pre-eminent ascendancy over modern times. I would refer in a special manner to the once renowned towers, walls, and column-supported gardens of ancient Babylon, to the stupendous and yet-existing colonnades of Palmyra, to the mighty ruins of Balbec with her temple of the sun, and of Memphis with her pyramids, temples, and catacombs, but more especially to the wonders of ancient Thebes, pouring forth in serried columns, from her hundred gates, her two millions of fighting men, with their chariots, and horses, and catapults, and all their desolating enginery of war.

From the countries of the Euphrates and the Nile, I would come down the stream of time to ancient Greece and Rome, whose style of architecture, though more chaste and tasteful, was less massy than that of Chaldea, and much less stupendous than that of Egypt. I would here speak of the Grecian temples in general, but especially of the Parthenon, the most celebrated of them all. Of Roman architecture some of the most memorable specimens were the ancient Capitol, the Pantheon, and the Colysseum, the two latter of which, having escaped the rage of conquerors, and the ravages of time, continue to present themselves as gigantic and glorious remains of the once proud and imperial, but now fallen and subjugated, metropolis of the world. Still however may that metropolis, though but the wreck of what she was, triumphantly boast of the wonders of her St. Peter's, the most august and magnificent of modern temples, and in some respects superior perhaps to any of antiquity. Nor, though omitted until now, must I pass unnoticed the temple of Jerusalem. Though of that edifice not "one stone was left upon another" by the hand of the destroyer, and though even the spot where it stood is disputed, it was probably, in its day, one of the most resplendent monuments of architectural creation the world could present.

Nor, did time permit me to dilate farther on this subject, would I neglect a due reference to the ancient architectural relics that abound in Spanish America. more espe-

cially to the vast but unexplored ruins of the once renowned city of Palenque. To the colossal temples and catacombs, the work not of years but of ages, which present themselves to the wonder of modern travellers in the empire of Hindostan, I would also advert with the observance which is due to them. And, having closed my references, I would add, that the whole, individually and collectively is the mighty product of the mechanical profession.

That that profession then has not heretofore received, and does not now receive, from the majority of the world, the consideration to which it is entitled, appears clearly I think from the foregoing observations. And, were it admissble in me to enlarge on it, the position might be still more cogently and satisfactorily illustrated and enforced, and more conclusively established. In these remarks I speak not, be it understood, of every one who belongs to the mechanical profession ; but of the profession itself.

I do not say that every mechanic is a man of genius, or a man who is entitled to a high and distinguished rank in the community. Far from it. The great body of the fraternity consists of mere operatives, whose hands are much more extensively employed than their heads. But the ingenious workman necessarily possesses and exercises mind. Eyes, muscles, and joints are not alone sufficient for the work he performs. And the mechanist and engineer, who invents and creates the machinery which he constructs, has as much of genius, though different in kind, as the poet or the novelist, the statesman or the philosopher.

The taste moreover of the mechanist is as favourably and strikingly exhibited in the exquisitely beautiful form and finish of his products, as is that of the poet in the aptitude of his illustrations, the correctness, delicacy, and beauty of his imagery, the choiceness of his language, the harmony of his numbers, and the polish of his style.

There is likewise in many of the productions of the mechanical profession a poetry and a history, a power of description and a depth of philosophy and passion, scarcely ever sur-

passed, and rarely equalled, in the works of the most accomplished and high-gifted writers.

Am I asked, in what specimens of mechanical creation these exalted attributes are embodied and shown? I reply, that in columns and pyramids, towers, temples, and mausoleums, are presented, in the most clear and forcible forms of expression, much of the *sublimity* and *grandeur* of poetry. Of a squadron of large ships of war, with colours flying, canvass spread, and sweeping on their course before a favouring gale, the same may be affirmed. It presents a poetic spectacle that is thrillingly sublime. And when two such squadrons meet in conflict, the sublimity of the scene can be equalled only, if equalled at all, by a volcanic eruption.

The *minor beauties* of poetry are brilliantly exhibited in works of jewelry, gold and silver tissue and embroidery, and other ornamental fabricks from the loom and the workshop. And, in the Apollo Belvidere, and the Venus de Medici, those beauties and elegancies are consummated, beyond what the language of poetry can achieve. By all who have beheld them, those statues are acknowledged to be *indescribably* beautiful. Nor is this all.

The Minerva and the Jupiter Olympus, of the great Grecian sculptor, are among the most perfect emblems of wisdom and power that the world has beheld. Historical monuments in marble and bronze are numerous and grand. And of the same class are many representations on canvass. The Elgin marbles are a splendid specimen of sculptured description. And reason and philosophy are as abundantly incorporated, and as potently displayed in steam-boats and loco-motives, as in the writings of Aristotle, Leibnitz, or Newton.

In many a painting, which is as genuine a mechanical production as a chair or a table, the delineation of passion is not only the very mirror of nature in truth and faithfulness; it is also ineffably powerful. Of all celebrated tragic and battle-scenes, this is and must be true; and in the picture of the "*hand-writing on the wall*," amazement and affright are even more than speakingly depicted. And the statue-group of

Laocoon and his sons, strangled and crushed, within the blood chilling coils of the sea-serpents, is an impersonation of terror and agony unutterable.

A Watt and a Fulton possessed as much of genius in their own way, and have conferred by it, through mechanism, as substantial and lasting, and perhaps as important benefits on our race as a Bacon and a Franklin did, by their wisdom and philosophy. As relates to the latter of these sages, he was himself a mechanist, and was indebted to mechanism for the mightines of his fame. Without his kite and his chord, his rod and his key, which are nothing but simple mechanical products, he could never have disarmed the thunder-cloud of its lightning, nor averted the stroke of its desolating bolt. Nor, without apparatus appropriate to his purpose, could he have revealed to the world the mysteries of electricity. To mechanism therefore he was indebted for that loftiest of compliments ever paid or due to a mortal ;

Eripuit cælo pulmen, sceptrumque tyrannis.

Having thus dwealt at some length on the affairs of others, I must now ask your indulgence in adverting for a moment to a concern of my own.

Because I am addressing a Mechanical Institute, it may be supposed perhaps by some, that I have been intentionally doing flattery to the mechanical profession. Should any one harbour a suspicion like this, I require of him that he dismiss it; and I tell him distinctly that he mistakes me, and does me wrong. Whatever may have been my failures in the discourse I am delivering, I have not been guilty of the fault of insincerity. I have dealt only in facts, and have spoken frankly what I honestly believe. On an occasion like the present, to tell truth, and award justice, as far as my powers and resources may admit, is my earnest wish, and my inflexible resolution. And to traffic for a moment in spurious panegyric would be a violation of both. Let the point I have been discussing be determined by the amount of genius and taste which the mechanical profession exercises, by the extent and importance of the services it renders, or by the measure of

rational enjoyment it provides for man, by the beauty, sublimity, and magnificence of its productions, or by all of them combined, and by such other considerations as may be relevant to the subject—let the matter be thus settled, and my conviction is unmixed with either scruple or doubt, that, as relates to its intrinsic merit and standing, that profession is far from being generally held in the estimation it deserves.

In conclusion. Of the products of the mechanical profession, in common with those of nature herself, it may be affirmed and demonstrated, not only that we are every where in the midst of them, but that they are every where appropriate, useful and indispensable.

When we survey the world of waters, we behold it subjugated and made subservient to the uses and enjoyments of man, by the genius of the mechanist. When we direct our attention to the dry-land, a like scene presents itself, in the triumphs of mechanism which are every where around us. Temples and towers, towns and dwelling-houses, I repeat, fruitful and ornamental gardens and cultivated and teeming farms are now before us, in landscapes where but recently deserts lay parched and fruitless, or wildernesses frowned. Wheel-carriages too of all forms and descriptions, wherever we cast our eyes, are in active operation, some by harnessed and caparisoned horses, and others by steam-engines; and, to facilitate their movement, forests are cut down, ravines filled up, broad and rapid streams bridged over, hills and mountains levelled or pierced, marshes turned to solid ground, and all other physical obstructions subdued. And when we explore even the atmosphere and the skies, we descry to our amazement the adventurous æronaut, like a modern Dædalus, sweeping through the heavens in his air-suspended car. And all is achieved by the genius of the mechanist.

In a word; the mechanical profession is instinct with the master spirit of reform and improvement; and that spirit has nobly done its work. The almost immeasurable distance between the lowest state of savagism, its ignorance and barbarity, superstition and debasement, and the most elevated condition of civilized life, its science, literature, refinement,

and morals, is referable, in a much higher degree, to the inventive genius and creative action of that profession, than to any other single source of human agency.

Let me not however, in the series of remarks I have submitted to you, be misunderstood. I have neither said nor designed to say, that other professions and pursuits, in common with the mechanical, are not essential to the well-being and the existence of civilized society. Far from it. On the contrary, in the commencement of my address, I virtually and directly intimated that they are. And, in still more express and positive terms, I here re-assert the fact. Nor is it my intention to do to any profession or pursuit the shadow of disparagement, or to attempt to raise any one above the standard it may rightfully claim. I have already declared, and now repeat, that to state truth and do justice, as far as I may compass them, is my inflexible purpose. Nor, am I conscious of having on any point departed from this resolution.

It might be well deemed superfluous in me to advert again to the importance of agriculture, which I have already pronounced the chief source of human subsistence. Of commerce and trade, barter and every other form of the exchange of property, it may be in like manner said, that they are indispensable requisites to the economy and welfare of civil communities. So are the three professions of divinity, physic and law; so is statesmanship, with its long array of rulers and their subordinates; so are teachers of every description; and so are authors, mathematicians, and philosophers by profession. So also are naval and military establishments, with all the offices and agencies that belong to them.

Out of these professions and callings, with others which a want of time forbids me to enumerate, is the great fabric of civil society constructed, held together, and completed in the provisions of its economy and government. Like the various tissues and organs that enter into the composition of the human body, the vocations alluded to are essential to the well-being of each other individually, and to the completion and perfection of the whole as an aggregate. As however in the human body certain tissues and organs predominate over others in the functions they perform, the same is true of cer-

tain professions, as to the parts they act, and the offices they fulfil, in the social system. All I have heretofore said therefore, and I now repeat it, is, that of these predominant callings the most practically important, as I honestly believe, is the mechanical profession. But it is essential to the general good, that the members of that profession should confine their operations and influences, within their own province, and not attempt to usurp power and exercise control in places of trust and scenes of action, with which they are unacquainted. And as relates to all other classes and individuals in the community, the same is true. Let all therefore confine themselves to the pursuits to which they are trained, exert their energies on what they correctly understand, and aspire to usefulness and distinction within their own proper spheres. Then, and then only, will harmony and good order prevail over their opposites, as well in public as in private affairs. Then may we hope that conflicting views and distracted counsels will go down, and concord and unanimity be established on their ruins. Then may we farther hope that knowledge, wisdom, and reality will triumph over all attempts at usurpation by ignorance, folly, and inflated pretension; and that the issue of the arrangement will be, an abundant advancement in the prosperity of nations, and a corresponding change in the condition and prospects of individual man.

Gentlemen of the Mechanical Institute :

A single reflection, in the form of an inference from the past disquisition, and I am done. If the mechanical profession be so indispensable in its products, and so important in its usefulness, as I have endeavored to represent it, how faithful, industrious, and conscientious should every one bred to it be in his pursuit of it, for his own welfare and reputation, for the renown of his country in genius and productiveness, and for the farther improvement and benefit of the world! And if, in reason and justice, so elevated be its rank, how steadfast should be the resolution, how ardent the ambition, and how persevering the exertions of every member of it, to render himself worthy of the station he holds, by the cultivation of his mind and the purity of his morals, the decorum of his deportment and the rectitude of his life!

